Maine Farm Safety Program

Bulletin #2151

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Potato Harvester Safety

Agriculture is one of the most dangerous occupations in this country. The National Safety Council reports there were 1,000 deaths and over 170,000 disabling injuries owing to agricultural-related accidents in 1985.

Farm machinery consistently ranks first as a factor in agriculturally related accidents. Know the limitations of the potato harvester as well as your own limitations. Thoroughly familiarize yourself with the safety features of the harvester before mounting or attempting any adjustment or repair. The potato harvester can be a dangerous piece of equipment.

A hazard is a dangerous object or situation which has the potential for injury. Both a potato harvester and *working* on a potato harvester fit into the category of a hazard.

Risk is the chance of injury, damage or loss. Risk of injury increases under unfavorable weather conditions and with improper behavior on the part of those involved with the potato harvest. Do your part and reduce risk to yourself and to others. Be alert, pay attention, and, above all, use common sense. The potato harvester is a powerful and unforgiving machine, not a toy. Safety should be a habit. Children should never play on or around the machine while it has the potential for motion.

Potato Harvester Safety

- **Never allow anyone to get on or off a moving harvester.**
- **Drive cautiously between fields.**
- **Make sure that guards and shields are in place.**
- **Never allow anyone between the tractor and the harvester if the machines are moving.**
- **Give an orientation of the machine to workers before they start.**

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Clothing can make the difference between being caught in a pinch or wrap point and being safe.

◆ Common Harvester Hazards

Each moving part of the harvester carries the potential for injury. The Tractor runs much of the mechanical movement by the power-take-off (PTO) shaft, which is connected to the tractor and the harvester by universal joints or yokes. The PTO shaft should be shielded. This entails covering the shaft and the universal joints with an external, rotating shield. The most common injury on a PTO shaft occurs when the yoke catches a loose piece of clothing, entangling the wearer. The rotating shaft and yoke are very capable of catching clothing.

All hydraulic systems operate under pressure, even as much as 2,000 pounds per square inch. This is three times the pressure needed to penetrate skin. **Never cover a leaking hydraulic hose with your finger; the fluid could be injected through your skin.** If any fluid is injected into the skin, it must be surgically removed within a few hours or gangrene may set in. If any point in the hydraulic system fails, a serious accident can occur. A ruptured hydraulic hose can spray fluid a great distance. Fluid under pressure attempts to escape. Hydraulic systems can be considered to store energy. Careless servicing or adjusting can lead to injury.

◆ Types of Injuries

Most injuries occur as a result of carelessness. Typically, one third of the injuries during the potato harvest involve fingers, hands, wrists, arms, and fingers account for over half the potato harvest injuries.

Injuries from a potato harvester can take a number of forms:

A *pinch-type injury* can occur where two parts move together and at least one of them moves in a circle. Gear and belt drives are examples of pinch points. Clothing or body parts can catch and become drawn into the gears. A person caught in a pinch point is at the mercy of a powerful, fast-moving machine.

A *wrap-type injury* can occur when an exposed, unshielded rotating component, such as a PTO shaft, entangles a loose piece of clothing; a sleeve, a shirttail, a frayed piece of clothing or even long hair. There is no escape from a wrap. The rotating shaft pulls you into and around the shaft in a fraction of a second. PTO shafts can quickly entangle and seriously injure even the strongest person.

Smooth PTO shafts with rust or nicks can be rough enough to catch clothing; a slowly rotating PTO shaft must be regarded with caution. However, the rounder, smoother shafts are less likely to catch clothing than square shafts. The universals at

the end of the PTO shafts are the most likely to catch loose clothing and cause a wrap-type injury. These bulky parts extend beyond the PTO shaft and can cause a wrap-type injury even if you are clear of the PTO shaft.

Shear points are areas where two pieces move in a cutting motion. *Shear injury* can occur on a potato harvester at the boom joints, which can be raised and lowered. A finger placed in a boom joint or between a fan belt and the pulley would be quickly severed. The airhead engine, like any other engine, has moving parts which can be dangerous. The belt, turned by the engine which drives the fan, is a site for amputation as well as other bodily injuries.

Crush points occur where two objects move towards each other or one object moves toward a stationary object. A harvester backing up to an embankment has the potential to crush someone trying to clean out belts from the back of it. Block the harvester if work must be done under it. This prevents it from falling and crushing the worker. Hitching or unhitching a potato harvester can also expose a worker to a crush point and potential *crush-type injury*. Driving over a worker's foot with a tractor is a possible crush injury during potato harvesting. Potential crush points exist with the bulk truck driving through the field. The wheels of the truck can crush feet or legs, or a worker could become crushed between the harvester and the truck. Obviously, the area between the harvester and the truck is a very hazardous area.

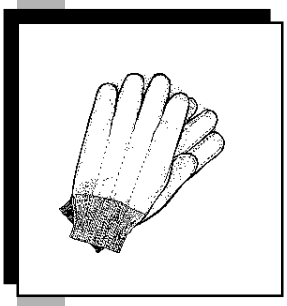
A *pull-in injury* occurs when a worker is pulled into machinery. Pull-in injuries can occur anytime there is an attempt to remove something from a machine while the machine is running. Obviously, this cleaning activity should never be done on an operating harvester. Even as a worker frees an entangled vine, it is conceivable that the worker could be pulled into the machine and seriously injured.

Thrown-object injuries occur when projectiles are hurled. A potato harvester, especially one equipped with an airhead, can throw soil and debris with enough force to cause eye injuries. Additionally, an object jammed in the belts can become dislodged or shatter and be hurled at a worker.

◆ Preventing Accidents

Fortunately, there is a great deal harvest workers can do to avoid accidents. Clothing can make the difference between being caught in a pinch or wrap point and being safe.

Avoid clothing that is loose, dangles or flops. An unbuttoned jacket can catch in the belts and drag a worker across the sorting table. A loose sleeve can catch in a sprocket and drag the worker into the gears



where severe damage can occur. Button the cuffs of long-sleeved shirts rather than leave them unbuttoned or loose and flopping. Long sleeved shirts with rolled up cuffs can flop or become unrolled and catch in moving parts. Pant legs can catch on gears in the same manner that shirt sleeves can. Avoid wearing pants that are extremely loose fitting or drag on the ground.

Loose, long hair is another risk. It can catch in wrap and pinch points and drag the worker's head into a dangerous spot. Wear long hair securely held up. A hooded jacket or hat will add insurance that your hair will not fall down and become entangled in the machinery.

Skid-resistant shoes help keep the worker from slipping while standing on the sorting platform, which may be treacherous with mud and vines. A fall into moving parts could be disastrous.

Gloves, if worn while working on the sorting table, should be tight fitting and not have frayed edges or flopping cuffs. Loose-fitting gloves can catch in many places and pull the hand into a hazardous situation.

In addition to making wise clothing choices, there are several practices which can help prevent accidents.

- **Never, never mount or dismount a harvester while it is in motion.** Wait until the harvester stops. This means that both the belts and the forward motion have stopped. Many older model potato harvesters have the ladders in front of the wheel. This places the person mounting and dismounting in a precarious position. Know the harvester you are working on. The wheel sticks out much farther than the machine. Be clear of the harvester, wheel, truck and tractor while the harvester is traveling through the field. In addition:

- **Be in a stable position before the tractor starts to pull the harvester.** This will reduce the possibility of falling down as the tractor jerks forward.

- **Do not place yourself, or allow yourself to be placed, in a dangerous position.** No one should ever be between the tractor and the harvester while they are in motion or when they are started. The tractor operator or the workers riding the harvester should never be close enough to touch the PTO shaft while it is running or is started up. This is also a good rule to remember when repairing the machine.

- **Clean trash out of belts when they are stationary and the harvester operator knows where you are located.** Never attempt to dislodge anything from the belts while they are in motion. Leave that little potato, rock or dirt clod

in the belt. Picking rocks or small potatoes from between bars risks crushing or severing a finger, wrist or hand.

- **Keep the work area clear of debris.** While the harvester is turning for another row, use that time to clear the area of rocks, soil clods or potatoes. This will encourage stable footing.

- **Concentrate harder during unfavorable conditions of rain and mud.** Workers riding on the harvester, and the harvester operator, will have to concentrate harder as conditions worsen.

- **Do not lubricate, adjust or repair the harvester while it is running.** Stop the harvester and do the necessary maintenance. A grease gun, oil can or wrench can become caught and possibly pull you into the machine or can be thrown back with great force.

Working Smart

As expected, most accidents are the result of human error, particularly poor judgment. Working under conditions of fatigue, carelessness and low concentration can lead to judgment errors and accidents. Know your limitations. Not all people are the same size, or possess the same physical, physiological or psychological characteristics. Typical mistakes include taking a short cut or forgetting a necessary safety measure, such as shutting off the PTO before dismounting. Jumping off a moving harvester instead of letting the machine stop is a dangerous practice and should be avoided.

Using mind-altering substances slows reflexes, limits concentration and is not safety-conscious behavior. Antihistamines contained in common, over-the-counter drugs can induce drowsiness, slow reflexes and

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lessen coordination. Visual and auditory acuteness decrease with age, along with reaction time and strength. Know your limitations.

Potato harvester work is conducive to mental, was well as physical, fatigue. Mental fatigue can lead to accidents through carelessness. Frequent short breaks are superior to infrequent long breaks for avoiding mental fatigue. Take a short break at least every three hours to reduce monotony and fatigue. Get off the harvester at break time. Consider trading jobs or positions on the harvester often. After a long break, such as after a meal or first thing in the morning, take the time to warm up. Make sure that you are not drowsy from the meal or the night before. Walk around to get the stiffness out of your joints. It is up to you to be alert.

Insist on an orientation of the specific harvester by the operator. It is possible that there are modifications to the machine that you are not familiar with. The age-old adage that the only dumb question is the one that is not asked holds true here.

Being hungry or off the machine for an extended time leads to reduced attention span and lessened concentration. For a similar reason, accidents may occur more frequently near the weekend.

◆ Safety Talks

Communication between the harvester operator and the crew of harvester workers is a key to safety. For increased safety, I recommend that one person riding on the harvester be designated as the “safety communicator.” His or her responsibility is to insure that all the workers are either on or are clear of the harvester.

With all his or her responsibilities, and the crew changeovers daily and even within one day, the tractor operator may have trouble keeping track of who is working and where they are supposed to be. A safety system could help and would not take much effort to put into place.

For example, the driver might look to the safety communicator after he or she mounts the tractor. The tractor does not move until the safety communicator signals OK. Any workers wanting to dismount the harvester for any reason would ask the safety communicator to signal the driver to stop — either midfield or at the end of a row. This would be the process for bathroom breaks, starting and stopping work for the day, or any other time workers might mount or

dismount the harvester. The driver would look for the safety communicator for all stop and start signals.

The concept of the safety communicator does not involve a supervisory role, but it could. The idea is that one person on the harvester know when people are on or off the harvester. The tractor driver cannot see all the people all the time. The potato harvester is a big, cumbersome machine that moves forward, and some of the time the driver will have to look forward.

The potato harvest is critical, but never worth risking your life. Again, do not allow yourself to be placed in a position of unnecessary risk. If guards are removed, ask that they be replaced. If the harvester operator, or any member of the harvest crew, is taking unnecessary risks alert them of it and, if necessary, work elsewhere. Walking away from a job, while you can still walk, is not the act of a coward.

Some of the highest injury figures come from those young in life. Lead the fullest life, but don't put yourself through unnecessary risks because you think you're invincible.

Photo by George Gartley

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